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SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY

PARASITOLOGY
COLLEGE OF VETERINARY MEDICINE
THE UNIVERSITY OF GEORGIA
ATHENS, GEORGIA 30602

UNITED STATES
FISH AND WILDLIFE
SERVICE
REGION FOUR

TELEPHONE
(404) 548-1032

cc: C. Butler 10/17/86

November 11, 1986

COPY

Mr. Carrell L. Ryan, Manager
Tennessee National Wildlife Refuge
Fish and Wildlife Service, USDI
Box 849
Paris, Tennessee 38242

Dear Mr. Ryan:

Enclosed are our reports on the deer herd health checks we conducted on the Duck River and Big Sandy Units, Tennessee National Wildlife Refuge, Humphrey and Henry counties, Tennessee, on August 25, 1986. The health checks each involved examination of five adult deer. The data from each Unit are arranged into a series of tables (parasitologic, serologic, and pathologic) and are accompanied by interpretive comments.

As is evident from our comments, we did not find overtly diseased animals from either management unit. The deer from the Duck River Unit may be at a slightly higher level relative to carrying capacity based on APC data and the level of lungworms and lung lesions. However, neither herd appears to be in a position of excessive disease risk, and both can be maintained near their present levels or slightly increased without concern for deterioration of herd health.

We trust that this information will be of value in management of these deer herds. Detailed information on the parasites and diseases covered in these reports can be obtained from the text Diseases and Parasites of White-tailed Deer. In particular, we would refer you to pages 411-423 for an explanation of the relationships between deer density, nutrition, and disease. The attached flier also has an elementary explanation of the basics of deer herd health. If you have any questions about these reports or if we can be of assistance on other matters, please do not hesitate to contact us.

Best regards,

Sincerely,

William R. Davidson

William R. Davidson, Ph.D.
Assistant Professor

WRD:dw
Enclosures
CC: Mr. James W. Pulliam, Jr.
Mr. Harold W. Benson
Dr. E. Frank Bowers
Mr. Donald Orr ✓
Mr. Gary T. Myers
Mr. J. Ronald Fox
Mr. Larry C. Marcum
Mr. Steven A. Lewis
Mr. Joe L. Herring
Mr. John I. Christian
Mr. Stephen W. Parry

Table 1. Arthropod, helminth, and protozoan parasites of six white-tailed deer (Odocoileus virginianus) collected from Tennessee National Wildlife Refuge (Duck River Unit), Humphrey County, Tennessee, on August 25, 1986.

Animal Number	1	2	3	4	5	5A
Age (years)	7	1	4	1½	1½	½
Sex	F	F	F	M	F	M
Weight (pounds)	130	102	106	118	108	44
Physical Condition	Fair	Good	Good	Fair	Good	Good
Hemoglobin	15.5	13.5	16.0	14.4	16.0	9.6
Hematocrit	48.0	42.0	47.0	40.0	44.5	30.0
Kidney Fat Index	17.9	36.1	41.3	13.5	19.4	NE

ARTHROPODS

Animal Number	1	2	3	4	5	5A
Lice	-	-	-	-	-	NE
Louse Flies	-	-	-	-	-	NE
Ticks	-	-	-	-	Light	NE
Chiggers	-	-	-	-	-	NE
Ear Mites	-	-	-	-	-	NE
Nasal Bots	-	-	-	-	-	NE

Location in Host		Number of Parasites Per Deer						Range	Prevalence	Average
	HELMINTHS	1	2	3	4	5	5A			
Subcutaneous										
Brain										
Circulatory										
Lungs	Parelaphostrongylus tenuis	-	-	-	2	2	NE	0-2	40%	0.8
	Dictyocaulus viviparus	4	-	-	6	1	NE	0-6	60%	2.2
	Protostrongylid larvae	+	+	+	+	-	NE	-	80%	-
Abdominal Cavity	Setaria yehi	-	5	-	6	-	NE	0-6	40%	2.2
Liver										
Esophagus										
Rumen										
Abomasum (APC* = 632)	Apteragia odocoilei	230	94	243	844	533	-	94-844	100%	388.8
	Ostertagia dikmansi	-	-	-	50	-	-	0-50	20%	10.0
	Ostertagia mossi	230	126	97	446	267	-	97-446	100%	233.2
	PROTOZOANS									
Blood	Trypanosoma cervi	-	-	+	-	-	NE	-	20%	-

*APC based on adult deer only

COMMENTS: Meningeal worms (Parelaphostrongylus tenuis) present in two deer and associated with a mild inflammation of the cranial meninges (meningitis). Large lungworms (Dictyocaulus viviparus) present at low levels. Protostrongylid larvae from meningeal worms and probably muscleworms (P. andersoni) present in low to moderate levels in most deer. Large lungworms and protostrongylid larvae were associated with mild lung damage (pleuritis, peribronchitis, bronchitis, pneumonia) in all deer. Abomasal parasites (Apteragia odocoilei, Ostertagia dikmansi, and Ostertagia mossi) at a moderate level (APC = 632) suggesting the herd is near nutritional carrying capacity. Abdominal worms (Setaria yehi) present and associated with a very mild inflammation of the abdominal cavity (peritonitis). Blood protozoans (Trypanosoma cervi) present but not considered important to herd health. Arthropod parasites at levels much lower than on most southeastern deer populations.

Physical condition ratings, body weights, kidney fat indices, and hematologic values within normal ranges associated with healthy deer populations. Pathologic studies disclosed perovarian cysts in one deer (a non-significant condition) in addition to the lesions attributable to parasitism noted above. Serologic studies were uniformly negative for antibodies to numerous infectious diseases.

An overview of these data discloses the following: (1) the herd is near nutritional carrying capacity based on APC data, (2) the herd currently does not appear to have significant levels of pathogenic parasites, (3) the herd has had no or very limited exposure to important infectious diseases, and (4) the herd appears to be comprised of relatively healthy animals. Based on these findings the herd can be maintained near its present level without undue risk of losses to disease. Substantial increases in the herd likely would be accompanied by deterioration in herd health with large lungworms being at least one of the important factors.

Table 2. Results of serologic tests for selected diseases in six white-tailed deer from Tennessee National Wildlife Refuge (Duck River Unit), Humphrey County, Tennessee, on August 25, 1986.

Disease	Deer Number 1	2	3	4	5	5A
Leptospirosis						
(serotype pomona)	Neg	Neg	Neg	Neg	Neg	Neg
(serotype hardjo)	Neg	Neg	Neg	Neg	Neg	Neg
(serotype grippotyphosa)	Neg	Neg	Neg	Neg	Neg	Neg
(serotype icterohemorrhagiae)	Neg	Neg	Neg	Neg	Neg	Neg
(serotype canicola)	Neg	Neg	Neg	Neg	Neg	Neg
Brucellosis	Neg	Neg	Neg	Neg	Neg	Neg
Infectious bovine rhinotracheitis (IBR)	Neg	Neg	Neg	Neg	Neg	Neg
Bovine virus diarrhea (BVD)	Neg	Neg	Neg	Neg	Neg	Neg
Parainfluenza$_3$ (PI_3)	Neg	Neg	Neg	Neg	Neg	Neg
Epizootic hemorrhagic disease (EHD)	Neg	Neg	Neg	Neg	Neg	Neg
Bluetongue (BT)	Neg	Neg	Neg	Neg	Neg	Neg

Table 3. Lesions and pathologic conditions in five white-tailed deer from Tennessee National Wildlife Refuge (Duck River Unit), Humphrey County, Tennessee, August 25, 1986.

Lesion/Condition	Deer Number 1	2	3	4	5
Mild meningitis	+	-	-	+	-
Fibrinous pleuritis	+	+	+	+	+
Peribronchitis/bronchitis	-	+	-	+	-
Focal pneumonia	-	-	-	+	+
Fibrinous peritonitis	-	+	-	+	-
Perovarian cysts	+	-	-	-	-

Table 1. Arthropod, helminth, and protozoan parasites of seven white-tailed deer (Odocoileus virginianus) collected from Tennessee National Wildlife Refuge (Big Sandy Unit), Henry County, Tennessee, on August 26, 1986.

Animal Number	6	7	8	9	10	10A	10B
Age (years)	1½	1½	1½	1½	1	½	½
Sex	F	F	M	M	F	F	M
Weight (pounds)	99	96	130	119	90	38	44
Physical Condition	Fair	Fair	Fair	Fair	Fair	Good	Good
Hemoglobin	16.5	17.5	15.8	17.0	16.4	7.6	11.9
Hematocrit	44.5	52.0	47.0	49.0	48.5	26.0	31.0
Kidney Fat Index	24.1	28.2	17.7	2.6	10.0	NE	NE

ARTHROPODS

Animal Number	6	7	8	9	10	10A	10B
Lice	-	-	-	-	-	NE	NE
Louse Flies	-	-	-	-	-	NE	NE
Ticks	Light	Light	Light	Light	Light	NE	NE
Chiggers	-	-	-	-	-	NE	NE
Ear Mites	-	-	-	-	-	NE	NE
Nasal Bots	-	-	-	-	-	NE	NE

Location in Host	HELMINTHS	Number of Parasites Per Deer 6	7	8	9	10	10A	10B	Range	Prevalence	Average
Subcutaneous											
Brain											
Circulatory	Parelaphostrongylus tenuis	-	-	-	1	2	NE	NE	0-2	40%	0.6
Lungs	Dictyocaulus viviparus	1	2	5	18	-	NE	NE	0-18	80%	5.2
	Protostrongylid larvae	NE	NE	NE	-	+	NE	NE	-	50%	-
Abdominal Cavity	Setaria yehi	15	7	1	-	-	NE	NE	0-15	60%	4.6
Liver											
Esophagus											
Rumen	Gongylonema pulchrum	7	9	6	9	21	NE	NE	6-21	100%	10.4
Abomasum (APC* = 356)	Apteragia odocoilei	257	165	311	300	150	-	-	150-311	100%	236.6
	Ostertagia dikmansi	43	-	-	-	-	-	-	0-43	20%	8.6
	Ostertagia mossi	-	55	89	-	50	-	-	0-89	60%	38.8
	Trichostrongylus axei	-	-	-	360	-	-	-	0-360	20%	72.0
	PROTOZOANS										
Blood	Theileria cervi	+	+	+	+	+	NE	NE	-	100%	-

*APC based on adult deer only

COMMENTS: Meningeal worms (Parelaphostrongylus tenuis) present at low levels in two deer but not associated with lesions. Large lungworms (Dictyocaulus viviparus) present in low to moderate levels in most deer and along with protostrongylid larvae (from meningeal worms) associated with mild subclinical lung damage (pleuritis, peribronchitis). Abomasal parasites (Apteragia odocoilei, Ostertagia dikmansi, Ostertagia mossi, Trichostrongylus axei) at a low level (APC = 356) suggesting the herd is below nutritional carrying capacity. Abdominal worms (Setaria yehi) and gullet worms (Gongylonema pulchrum) present but not considered important to herd health at the levels encountered. Blood protozoans (Theileria cervi) present in all deer but not considered detrimental in deer that are otherwise healthy. Arthropod parasites below levels commonly found on deer in the Southeast.

Physical condition ratings, body weights, and hematologic values not remarkable. In addition to lesions attributable to parasitism (noted above), pathologic studies disclosed viral induced skin tumors (fibromas) on one deer and a nonspecific inflammation of the lymph nodes in two deer. Serologic tests for several important infectious diseases were uniformly negative.

An overview of these data discloses the following: (1) the herd appears to be below nutritional carrying capacity based on APC data, (2) the herd has subclinical levels of pathogenic parasites although the prevalence of large lungworms is high, (3) the herd has not been exposed to many important infectious diseases although one viral agent is present, and (4) the herd appears to be relatively healthy although condition ratings and body weights are exceptionally not high. Based on this information the herd can be held near its present level or allowed to increase slightly without undue risk of deterioration of herd health. Any substantial increases, however, will likely be accompanied by deterioration in health with large lungworms being an important factor.

Table 2. Results of serologic tests for selected diseases in seven white-tailed deer from Tennessee National Wildlife Refuge (Big Sandy Unit), Henry County, Tennessee, on August 26, 1986.

Disease	Deer Number						
	6	7	8	9	10	10A	10B
Leptospirosis							
(serotype *pomona*)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
(serotype *hardjo*)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
(serotype *grippotyphosa*)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
(serotype *icterohemorrhagiae*)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
(serotype *canicola*)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Brucellosis	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Infectious bovine rhinotracheitis (IBR)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Bovine virus diarrhea (BVD)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Parainfluenza$_3$ (PI_3)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Epizootic hemorrhagic disease (EHD)	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Bluetongue (BT)	Neg	Neg	Neg	Neg	Neg	Neg	Neg

Table 3. Lesions and pathologic conditions in five white-tailed deer from Tennessee National Wildlife Refuge (Big Sandy Unit), Henry County, Tennessee, August 26, 1986.

Lesion/Condition	Deer Number 6	7	8	9	10
Fibrinous pleuritis	+	-	+	-	+
Mild peribronchitis	NA	NA	NA	-	+
Enlarged lymph nodes	-	-	+	+	-
Infectious cutaneous fibromas	-	-	-	+	-

NA - Histopathologic samples of lung tissues not located; lung pathology based on gross examination only.